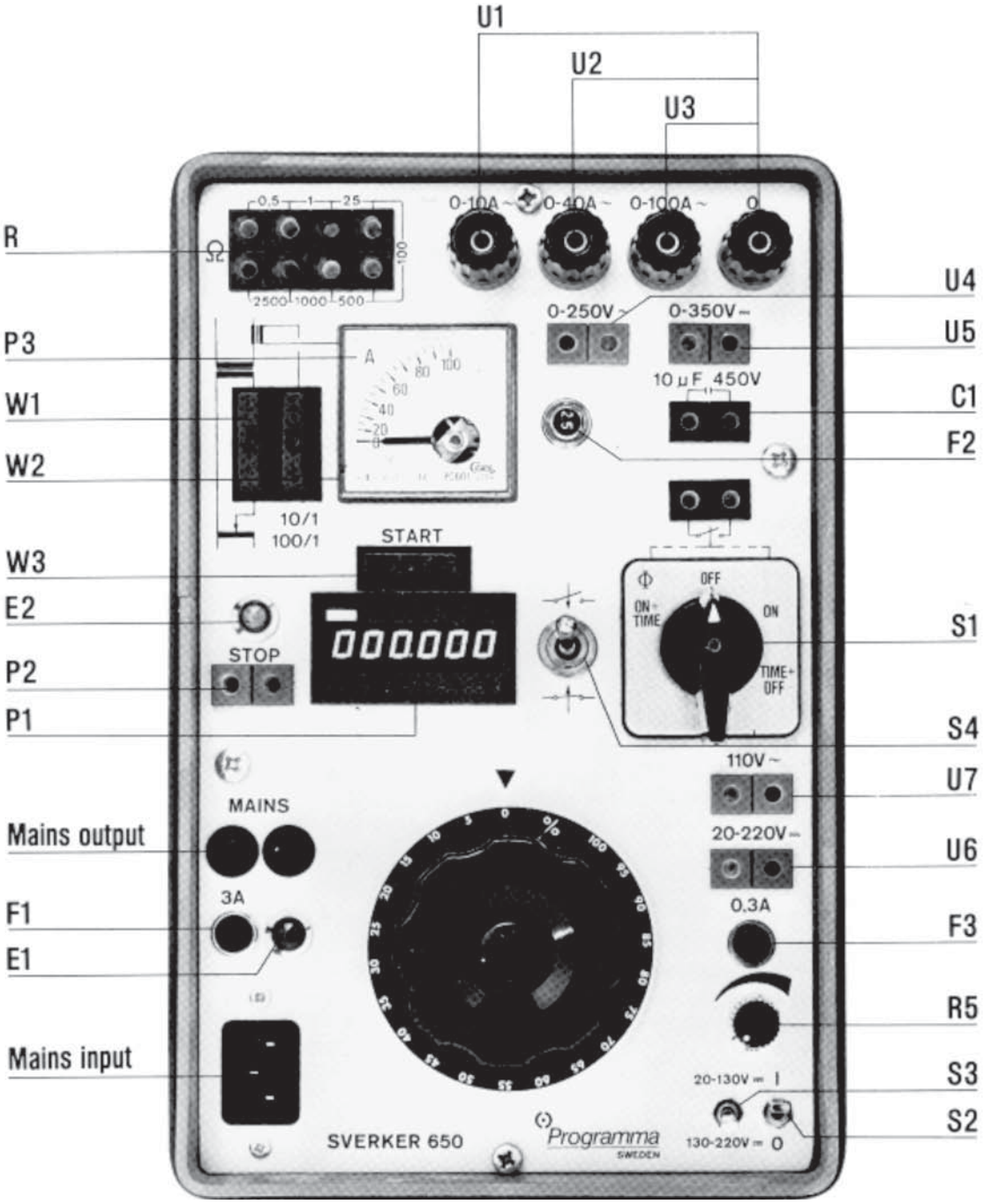
SVERKER 650

Relay Test Unit

Programma Products

User's Manual



Terminals	**Unloaded, 230 V**	
U1 0-10 A	85-90 V	AC Settable with T1
U2 0-40 A	25-27 V	AC Settable with T1
U3 0-100A	10.0-11.0V	AC Settable with T1
U4 0-250 V,3 A	250-270 V	AC Settable with T1
U5 0-350 V, 2A	350-370 V	DC Settable with T1
U6 20-220 V		DC Settable with R5

The voltage is stabilized and variable in two steps with the switch S3.
Characteristics at input voltage 220 V AC + 10 %
Ripple (peak to peak) max 4 %
Load regulation 3 %
Line regulation less than 4 %

U7 110V,0.3 A 110-125 V AC
F1 Automatic cut-out for the mains voltage, 4 A
F2 Automatic cut-out 3 A
F3 Automatic cut-out 0.5 A
E1 Green indicator for mains voltage
E2 Yellow signal lamp in the trip circuit
P1 Electric timer, independent of mains frequency Measuring range 0-999.999 sec. Accuracy 0.002 % of readout +0,-2 ms
P2 Input for stop of timer
P3 Ammeter class 1.5
C1 Capacitor 10 ~F/450 V AC for reactive power relays
S1 Main switch
S2 On/off switch for terminals U6 and U7
S3 Selector voltage range terminal U6
S4 Make/break switch for timer
R5 Voltage adjustment terminal U6
W1 Terminal for connection of a resistor on the primary side of the output transformer
W2 Terminal for an external ammeter
W3 Terminal for external start and stop of timer

General

The power unit is a rugged instrument but it still should be handled with care.

The relay testing unit is electrically fully isolated in all measuring ranges, except for the mains output. The set of resistors is not connected with the rest of the relay testing unit set.

When current measurement is crucial; use an external instrument with a more accurate resolution. The external instrument can be connected to the built-in current transformer (terminal W2).

Relays with non-linear impedance can cause distortion of the current. This can be restrained by connecting a resistance (as high as possible) in series with the primary winding of the output transformer (terminal W1).

The output transformer is protected by a thermal contact. If the thermal contact trips, the display of the timer will go out. The thermal contact will be reset automatically when the temperature drops.

The output (U6) is provided with over-current protection, that will break the circuit in case of overload. The protection is reset if (S2) is switched off in aprox. 30 seconds.

Instructions

1. Make sure that the switch and the variable transformer is set in position ”0”.
2. Connect the test leads.
3. The variable transformer should always be set in position ”0” when a test is started.

Attention! *The terminal of the current transformer shall always be short-circuited when current is flowing from the instrument, either through the short-circuit clamp or through an external ammeter.*

Do not leave the Sverker 650 switched on unattended.

Testing current relays

1. Set the variable transformer in position “0”.
2. Connect the circuit, use output terminals 0-10 A (85 V), 0-40 A (25 V) or 0-100 A (10 V).
3. Increase the current to the operating value using the variable transformer.
4. Check the current on the ammeter or external instrument during the test.

Testing voltage relays

1. Set the variable transformer in position “0”.
2. Connect the circuit. Output terminals 0-250 V, or at a voltage below 10 V, output terminals 0-100 A. If you need a higher AC-voltage, terminals 0-250 V can be connected in series with the mains output terminals. When testing DC-voltage relays, use terminals 0-350 V=.
3. Increase the current to the operating value using the variable transformer.
4. Check the current on the ammeter or external instrument during the test.

Use an external measuring instrument for better accuracy.

Testing power relays

1. Set the variable transformer in position “0”.
2. Connect the circuit. Output terminals 0-10 A, 0-40 A or 0-100 A are used for the current coil. Use an external measuring instrument for better accuracy. When testing reactive relays, the current coil is to be connected in series with the built-in 10mF capacitor that will give a 90° phase shift. The voltage coil is to be connected directly to the 110 V AC terminals or across the set of resistors used as a voltage divider.
3. Increase the current to the operating value using the variable transformer.
4. Check the current on the ammeter or external instrument during the test.

Note: *Shift polarity of the voltage or current if function has failed to appear.*

Time measurement

Connect the time measuring circuit to potential free terminals or DC voltage 3-350 V.

Note: *If the polarity is shifted the timer does not stop. The timer is independent of mains frequency.*

When the timer is stopped, the circuit is broken and the yellow signal lamp is lit. For continued measuring, the main switch first has to be reset in position”0”. If the tripping circuit is connected and the switch is set in position “ON”, the yellow signal lamp is lit when the operating value is obtained without breaking the current.

The timer can be started externally by a make at terminal (W3). The switch (S1) should then be in position “ON+TIME” or “OFF+TIME”. When using the timer internally, the terminal (W3) has to be short-circuited.

Time measurement of over-current and over-voltage relays

1. Connect the current and tripping circuits.
2. Set the switch in position “ON”.

3. Increase the current/voltage to 25-50% over the operating value and let the variable transformer be in that position.
4. Reset the switch to position "0".
5. Set the changeover switch for time measurement in position make/break
6. Set the switch to position "ON + TIME".

Time measurement of under-current and under-voltage relays

1. Connect the tripping circuit.
2. Set the changeover switch for time measurement in position make/break.
3. Set the switch in position "ON".
4. Increase the voltage/current until the relay picks up.
5. Then set the switch in position "OFF + TIME".

Specifications

Other: Output used to start external cycles. Terminal for external start/stop of built-in timer. Terminal for connecting serial impedance when testing nonlinear protection.

AC Current outputs			
Range	**No-load voltage (min)**	**Output voltage (min)**	**Load/unload times On (max)/Off (min)**
0-10 A	85 V	75 V (10 A)	2 minutes/ 30 minutes
0-40 A	25 V	19 V (40 A)	20 seconds / 15 minutes
0-100 A	10 V	7.7 V (100 A)	20 seconds / 5 minutes

AC/DC outputs	
Range	**Output voltage (min)**
0-250 V AC	220 V (2.7 A)
110 V AC (fixed)	110 V (0.3 A)
0-350 V DC	280 V (2 A)
20-220 V DC (stab)	220 V (0.25 A)

MEASUREMENT SECTION

Timer: Range: 0 - 999.999 s. Resolution: 1 ms.

Accuracy: ± 0.02%, +0-2 ms of displayed value. Independent of mains frequency.

Ammeter: Built-in: 0-10 A, 0-100 A. Accuracy: ± 3%. Output for external ammeter connected to built-in current transformer. Accuracy: ± 0.5%.

OTHER

Application field: The instrument is intended for use in high-voltage substations and industrial environments. Built-in capacitor provides phase shift when testing directional protection, and a set of resistors can be used to divide voltages.

Protection: Thermal cut-outs and miniature circuit breakers.

Mains voltage: 115 or 230 V AC ± 10%, 50-60 Hz.

Dimensions: 280 x 178 x 250 mm (11" x 7.0" x 9.8").

Weight, 115 V: 15.3 kg (33.7 lbs). 25.4 kg (56 lbs), incl. accessories and transport case.

Weight, 230V: 16.3 kg (35.9 lbs). 25.4 kg (56 lbs), incl. accessories and transport case.

Dielectric strength: Complies with IEC 348 and IEC255.5.

The above specifications are valid at nominal input voltage and an ambient temperature of +25 °C (+77 °F). Specifications are subject to change without notice.

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